

ABSTRACT

A method for DNA reassembly after random fragmentation, and its application to mutagenesis of nucleic acid sequences by *in vitro* or *in vivo* recombination is described. In particular, a method for the production of nucleic acid fragments or polynucleotides encoding mutant proteins is described. The present invention also relates to a method of repeated cycles of mutagenesis, shuffling and selection which allow for the directed molecular evolution *in vitro* or *in vivo* of proteins.